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SHORT NOTES

MR. PAUL B. SEARS publishes an interesting account of the "Insect Galls of Cedar Point (Ohio) and Vicinity" in the December number of the *Ohio Naturalist*. It is accompanied by four plates in which every gall (63 in number) is figured.

DR. M. T. COOK'S "Report of the Pathologist" of the New Jersey Agricultural Experiment Station, for the year 1913, contains a useful annotated list of the most common diseases of the year, arranged alphabetically by hosts. Apples and potatoes had the most diseases (13 and 12), with sweet potatoes following close with 9, and tomatoes with 7.

DR. G. H. SHULL continues to publish plant-breeding papers, as "Sex-limited Inheritance in *Lychnis dioica*," [3] and "A Peculiar Negative Correlation on *Œnothera* Hybrids." [4]

HERE may be favorably mentioned A. G. Vestal's "Prairie Vegetation of a Mountain-front area in Colorado" [5] with eight good half-tones and a physiographic map of the region studied (near Boulder).

IN the January number of the *American Naturalist* Professor E. C. Jeffrey publishes a vigorous criticism under the title "Some Fundamental Morphological Objections to the Mutation Theory of De Vries." The writer concludes that "hybridism is the best explanation yet put forward of the peculiar conduct of *Œnothera lamarckiana*, as well as other species of the genus in cultures." Apparently this is also the conclusion reached by Professor B. M. Davis in the same number of the *Naturalist* in his article "Professor De Vries on the Probable Origin of *Œnothera lamarckiana*."

TWO new botanical journals, *Journal of Agricultural Research* and *American Journal of Botany* merit favorable notice here. The first is published by the United States Department of Agriculture, and the second is the official publication of the Botanical Society of America. The first is by no means wholly botanical, and yet the articles dealing with plants, while tinged by some economic coloring, are of interest to the scientific botanist also. The second has taken high rank from the first in the literature of scientific botany. Its office of publication is the Brooklyn Botanic Garden.

IT inspires hope to find that the "part" of the "North American Flora" which appeared December 31, 1914, is the first part of the final volume (34), but this hope of early completion is much dampened when we find that this part brings the total number of pages now printed up to about 2,000, which is only about one ninth of what the whole work will contain. It would not be fair, however, to estimate that since it has taken more than nine years to print this much (one ninth) it will require nine times as long, *i. e.*, about one hundred years, to complete the Flora, for it must be remembered that authors have been at work on most of the volumes for the past ten years, and that we shall soon have a rapid appearance of successive parts. This particular part, which is principally from the hand of Dr. Rydberg, begins the tribe *Helenieae* of the family *Carduaceae*, and carries it into the tenth of the fourteen sub-tribes.

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[3] *Zeit. of induktive Abstam. u. Vererb.*, Bd. XII., Heft 5.

[4] *Jour. of Genetics*, Vol. IV., No. 1.

[5] *Bot. Gaz.*, Vol. LVIII., No. 5

SPECIAL ARTICLES

A FOURTH MALLOPHAGAN SPECIES FROM THE HOATZIN

THE hoatzin is a curious, rather pheasant-like, South American bird, which is the only species in the strongly aberrant family Opisthocomidæ, a family that is usually even ranked as a distinct avian order. This order or family, which is to say, this bird, has long been and still is a puzzle to the classifying ornithologists. Its genetic affinities are quite uncertain, although the approved general practise of the bird books is to put the family into a pigeon-hole next to that of the pheas-

ants or the pigeons, and close to that of the rails. But the hoatzin also shows certain affinities with the plantain-eaters (Musophagidæ) and even, as Beebe points out, with the primitive lizard-tailed bird of the Upper Jurassic slates of Bavaria, the famous *Archæopteryx*.

In 1909 I had the welcome opportunity of examining a number of Mallophaga taken by Mr. C. William Beebe, curator of birds in the New York Zoological Park, from a hoatzin in Venezuela (its native land). I hoped these parasites might afford some clue to their strange host's genetic relationship, in that, if the Mallophaga proved to be kinds characteristic of pheasants, or, indeed, of any other group of birds, this fact might be advisedly taken into account by the systematic ornithologists. For it is quite certain that in many cases the host distribution of the Mallophagan parasites of birds *is* determined primarily by the genetic relationships of their hosts.

The Mallophaga of the hoatzin, representing three species of the parasites, did indeed prove to be characteristic—but, unfortunately, characteristic of the hoatzin! Two were new species, one a *Lipeurus* and one a *Colpocephalum*, belonging not at all to pheasant-infesting groups of *Lipeurus* or *Colpocephalum* species. Indeed the hoatzin's *Lipeurus* manifestly belongs to a group whose other members infest exclusively maritime birds, while the *Colpocephalum* also shows a likeness to two other species of the genus taken from maritime birds, although it is also rather like a third species described from a francolin (African partridge). The third species, a *Goniocotes*, is also recorded only from the hoatzin—Nitzsch found it on the bird fifty years ago—but it is of a genus which is otherwise almost restricted to pheasants. To this extent, and this only, did the parasites of the hoatzin as recorded by me in 1910[1] offer any suggestions as to the taxonomic position of the host.

I have recently had the opportunity of examining a fourth Mallophagan species from the hoatzin. In a collection of Mallophaga miscellaneously taken by Robert Cushman Murphy, of the Brooklyn Institute Museum, in recent years in various places, I find five specimens of a *Læmobothrium* recorded as taken from a hoatzin on the river Orinoco in Venzuela (date not given). Three of the specimens are immature, but two are adult and represent both sexes.

The extraordinary thing about this *Læmobothrium* of the hoatzin is that, although it has been described by Cummings (Bull. Ent. Research, Vol. IV., p. 43, 1913) of the British Museum as a new species it is certainly very closely related to an already known species described under the name *L. setigerum* by Piaget in 1889 from the Cayenne ibis (*Ibis cayennensis*) which is a native of the same general geographic region to which the hoatzin is confined, namely, South America from the Amazon northward. Indeed, my own judgment is that the hoatzin's parasite should rather be called a variety of this species than the representative of a new one. *Læmobothrium setigerum* is a striking Mallophagan species, well-characterized by a group of curious, heavy, flattened and broad, short, spine-like hairs projecting forward from the clypeal margin, and it is certainly a parasite of ibises and cranes, for I have recently described two other varieties of the species from other ibises. One of these varieties, *L. setigerum* var. *africanum*, came from *Theristicus hagedash* from the Kilimandjaro region of East Africa (collected by Sjötedt's Swedish Expedition to Kilimandjaro-Meru), and also from the same host taken near Mfongosi in Zululand by a collector for the Durban (Natal) Museum. The other variety, *L. setigerum* var. *cubensis*, came from a courlan (*Aramus giganteus holostictus*), from Cuba, collected by Mr. C. D. Ramsden.

It is interesting enough to find a single striking Mallophagan at home on a Cayenne ibis of South America, a wood ibis of East Africa and a courlan of Cuba, but the interest becomes excessive when a closely allied species is found on the hoatzin in Venezuela. Is the hoatzin, after all, less of a pheasant or

[1] *Zoologica*, Vol. I., pp. 117–21, Figs. 38 and 39.

a pigeon and more of a water bird than commonly held? It does indeed, as observers have repeatedly pointed out, have a habitat and habits not unlike those of such water-liking birds as ibises and rails. It inhabits trees and undergrowth along rivers and in marshy regions. It makes nests usually in trees over water. The nests are also, says Beebe, the most recent and most careful observer of the habits of the strange birds, hardly distinguishable from those of the guinea herons, and built in the same situations. But all this may, of course, mean nothing as to the bird's phylogeny.

The suggestion that may come from some that my specimens of *Lœmobothrium* from the hoatzin may have come to this host from some Venezuelan ibis or heron host by natural straggling is extremely unlikely for Mallophagan individuals of different bird species. This is only recorded, and practically only possible, among individuals infesting two bird sorts that consort gregariously in considerable numbers and closely. This is not true of the hoatzin, as Beebe's observations make clearly evident. Mallophaga are in only rare instances, outside perhaps of crowded hen-houses and chicken yards, colonies of chimney swifts or swallows, and places of common roosting or other foregathering of many bird individuals of a kind, found *alive* (or even dead) off the body of a bird. They make their migration from host individual to individual on occasions of actual bodily contact of these hosts, as at mating, and in the nest.

So it is practically certain that the hoatzin is host to a Mallophagan kind, which is most nearly related to a species, or, perhaps indeed, is but a variety of the very species, found heretofore only on Old and New World ibises and courlans.

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THE TOXICITY OF INSECTICIDES

CERTAIN facts which may be of general importance in physiological investigations were brought to light in a study of the toxicity of insecticides now under way at the California Agricultural Experiment Station.

A very elaborate series of determinations were made on the effect of hydrocyanic-acid gas on scale insect eggs. The plan of the experiment was to separate the eggs found beneath a scale insect into two lots of about equal size, placing them in gelatin capsules, one lot being allowed to hatch without treatment, and the other after being exposed to the gas for a definite time. The species studied lay on the average rather more than a thousand eggs, and each series of experiments included the eggs from a hundred insects. Nearly three hundred series were thus studied, including five different species of scale insects from eleven different localities in California.

Solutions of hydrocyanic acid of varying concentration were placed in closed glass containers and the open capsules containing eggs to be treated were suspended above these solutions. The density of the gas above these solutions is dependent on the concentration and temperature.

After hatching, the capsule was placed under a microscope and an estimate was made of the hatch in each lot, using only the numbers 05, 10, 20, 30, 40, 50, 60, 70, 80, 90, 95, 100 per cent. The following table will show the results of one series.

The upper right-hand corner gives the results with the weakest dose and shortest time. As would be expected, in the opposite corner, there is no hatch and the mean percentages given below show the effects of the different concentrations, the last two or three of which are completely ineffectual since the hatch is the same as the untreated check lots.

The series of means given at the right bring out an entirely unexpected result, apparently showing that the length of time the eggs remained exposed to the gas has very little effect. This is, however, not at all the fact as shown by the curves on the left side of the table.

The average means of 72 series of experiments with the same insect from the same food plant and locality are 58.31, 59.20, 56.10,